The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XLV. No. 1170. SATURDAY, NOVEMBER 29, 1941. 6D. PER COPY: POST FREE 8D.

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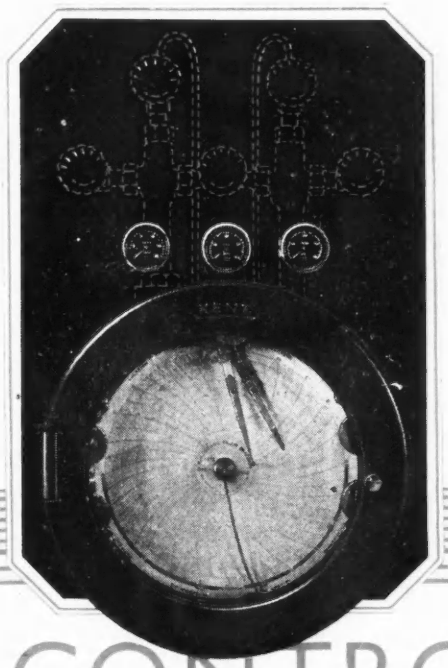

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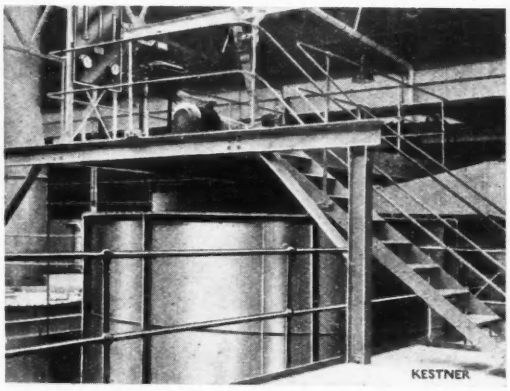

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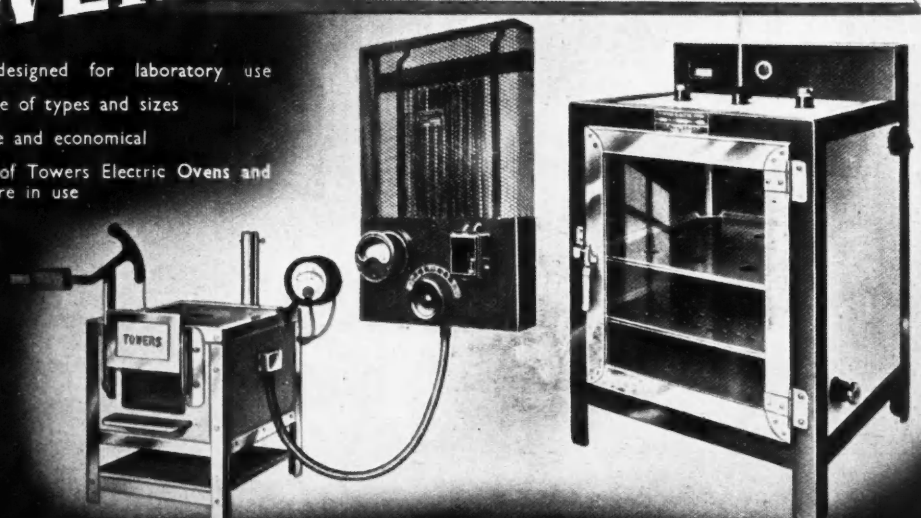

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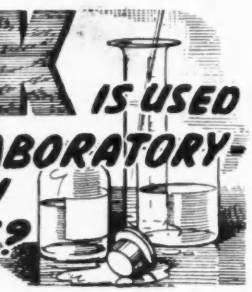

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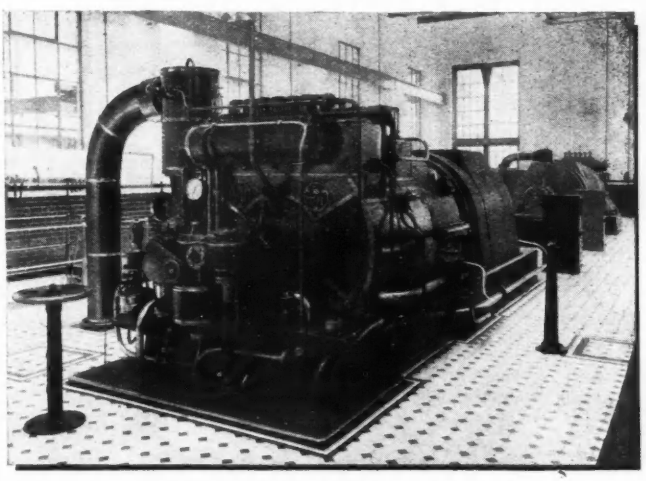

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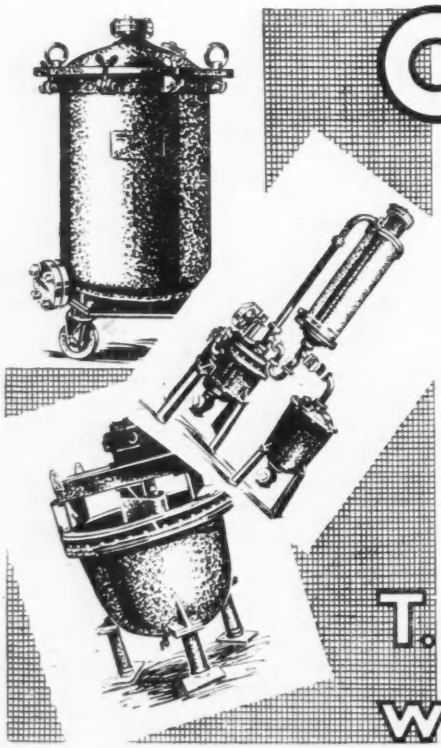

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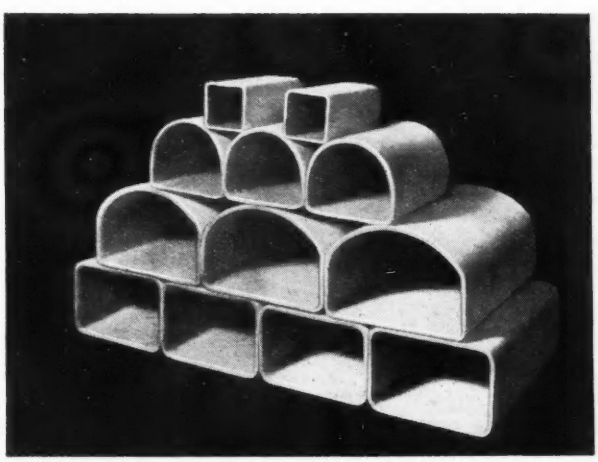

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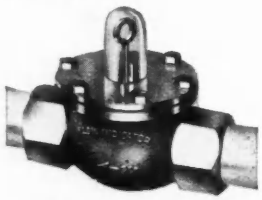

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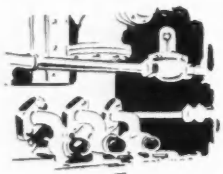

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2. This organization will be known as the

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(subsequently referred to as the T.R.C.) and a private limited liability company with an authorized capital of £500,000 has been registered accordingly. There will be no public issue of capital.

3. The principal objects of the T.R.C. are :—

(*a*) To provide for the co-ordination and extension of research in matters of common interest with a view to accelerating the discovery of new substances for the service of therapeutic and preventive medicine ; to ensure proper collaboration with medical, dental and veterinary practitioners in the introduction of new medicinal substances and to assist in the advancement of the art of medicine by the subsidization of research on a broader and more rational basis than has so far been possible in the British Pharmaceutical Industry.

(*b*) To provide for the pooling of manufacturing facilities, where desirable.

(*c*) To enable the industry to co-operate more effectively in national planning by presenting to the Government through its appropriate medical, dental, veterinary, scientific and technical organizations the pooled knowledge and facilities acquired by the constituent companies in the field of therapeutic research.

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5. The Board of the Corporation will consist of the Chairmen or Managing Directors of the constituent Companies.

6. Plans for research will be drawn up from time to time by a Research Panel consisting of the Heads of Research from each of the constituent Companies. This Panel will co-opt or consult with other scientific workers as and when special problems arise. Similarly arrangements for production will be made in due course by a Production Panel consisting of the Heads of Production of the constituent Companies.

7. Products evolved as a result of research sponsored by the Corporation will be marketed and sold by the constituent Companies under a common name. The T.R.C. will assist wherever practicable in simplifying the nomenclature of new medicinal substances.

8. The fundamental basis of these collaborative arrangements is *research* and the basic qualification for the inclusion of the above Companies in the Corporation is that each of them has been actively engaged for many years in the research, manufacture and distribution of products prescribed by the Medical, Dental and Veterinary Professions and sold by Pharmacists. Their research staffs in Great Britain include many eminent workers in the field of medical, chemical, physiological, bacteriological, veterinary, pharmaceutical and allied research as well as a number of qualified medical men and veterinary surgeons who are associated with these companies in whole-time research and advisory work. The contacts of the constituent Companies with scientific workers as well as their connections with other Companies in the Fine Chemical and Pharmaceutical Industries (either through subsidiaries, branches, agencies or working agreements with other firms) are world-wide.

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VOL. XLV. No. 1170 November 29, 1941 Annual Subscription, 21s. Overseas, 26s.

NOTES AND COMMENTS

Rationalising Research

RATIONALISATION of research in matters of common interest is a policy we have often advocated for the chemical industry; and now a branch of the industry—that dealing with fine chemicals—has taken just this step. The formation of the Therapeutic Research Corporation, henceforth known as T.R.C., is claimed with some justice to be the most important step in the rationalisation of the fine chemical industry. A note of the official registration of the private limited company which constitutes the Corporation was included in our issue of last week, and in our advertisement pages to-day the aims and objectives of the Corporation are set forth. The names of the companies concerned in the Corporation: Boots Pure Drug Co., Ltd.; The British Drug Houses, Ltd.; Glaxo Laboratories, Ltd.; May and Baker, Ltd.; and The Wellcome Foundation, Ltd., are a sufficient guarantee that any research undertaken by the Corporation will be effective. Each of the five companies participating in the joint scheme has over a long period of time carried out extensive scientific research which has been of great value to humanity. This work has, however, been conducted on individualistic lines which will not apply to work undertaken by the Corporation. Any new drugs which may be discovered by the Corporation will not be monopolised by any one company. It is, however, emphasised that the T.R.C. is *not* a merger or amalgamation of the companies concerned, each of which retains complete freedom of action in its special fields and, while contributing to a common research pool, forfeits none of its special characteristics.

Towards Academic-Industrial Alliance

WITH this lead as an exemplar it should surely not be impossible for other sections or groups of the chemical industry to evolve a similar scheme to the mutual benefit of the participating units. The advantages are manifest and manifold. Increasing specialisation of scientific technique tends more and more to call for men with long experience in particular methods; it also often calls for complicated and expensive equipment for its execution. The rapidly advancing volume of knowledge concerning the varied aspects of chemistry is now so great that to attain a full grasp of any one problem calls for a team of specialists in order that knowledge in these fields may be further extended. These are only a few of the means whereby advantage may result from a scheme of co-ordinated research and unified effort. Greater thoroughness and higher speed of investigation should follow and much wasteful overlap be eliminated. Furthermore, there has existed in the past a diffidence on the part of some academic research workers in this country to ally themselves wholeheartedly with the researches of industrial firms. The seeds of such an alliance have nevertheless been sown during the past decade. The new Corporation should be able to achieve much in fertilising this growth by further breaking down the barriers and by establishing closer liaison between industry and the research laboratories of the universities. Should this practical application of co-operative research come, by good fortune and good sense, to be the model of other organisations within the chemical industry, there would appear to be no limit to the possibilities of friendly alliance in research between the laboratories of university and of factory.

Chemical Education in the Works

QUITE another aspect of the extension of chemical knowledge, though an equally important one, is dealt with by Mr. James H. Clayton, of the Manchester Oxide Co. Ltd., in a communication to the Society of Chemical Industry (*Chem. and Ind.*, 1941, *60*, 47, p. 827). He reports that two of the associated companies of which he is a director have recently inaugurated a series of classes, for foremen and assistant foremen, in the elements of chemistry and physics. This is indeed a practical application of the principle enunciated recently by the Parliamentary Secretary to the Minister of Labour (also, it may be noted, in a speech at Manchester), recorded in our columns a fortnight ago. Let us hope that it may prove another instance of "What Manchester thinks to-day. . ." In Mr. Clayton's case the companies concerned were fortunate to secure an experienced teacher of chemistry, and the men taking the classes absorbed the fare provided in an "almost greedy" way, so that they were universally pronounced an unqualified success. Before the lectures the teacher was shown round the works by the various departmental managers so that he was able to make points in his lectures in terms of the processes worked by the men. As a result the younger men were able to feel they were progressing, and the bond between management and foremen has been strengthened as an outcome of the knowledge shared.

The Defence of Bauxite

THE intervention of the U.S. Army in Surinam (Dutch Guiana) is an indication of the importance placed in America on safeguarding the nearest supply of bauxite. The Surinam bauxite mines provide over 60 per cent. of the requirements of the United States aluminium industry, and, together with the deposits in British Guiana, constitute the most important source of this precious war material in the Western Hemisphere. This military precaution taken by the United States has, it is hardly necessary to state, the full concurrence of the Netherlands Government, and the contingent will be withdrawn at the conclusion of hostilities. In normal circumstances it would be within the responsibility of the military authorities of the Dutch East Indies to take any steps necessary to ensure the safety of Surinam; but conditions to-day in the S.W. Pacific are not such as to encourage the withdrawal of any troops from that region. The Government of Brazil is co-operating in the safety measure and the Brazilian frontier guard on the southern border of Dutch Guiana has been instructed to be especially watchful against the incursion of possible saboteurs. It is quite evident that the machinations of Hitler in this quarter of South America have not escaped the notice of the proper authorities, and an exchange of information on the subject has been arranged among the three Powers concerned.

Advances in American Chemical Equipment

Exhibits at the Chemical Industries Exposition

DIVERSIFICATION, which has always been the most striking characteristic of the chemical industries, has been greatly stimulated in America by the new demands created by the war and the national defence programme. This makes the 18th Exposition of Chemical Industries (held in New York) additionally interesting for it is largely a display of the methods adopted by chemical manufacturing and engineering firms in circumventing difficulties of supply and the like. Exhibits of equipment, materials and supplies for industry, shown at the exposition, therefore, constitute a wide field of interest for chemists, chemical engineers, etc. Of prime interest are the technological displays, including new instruments and laboratory equipment. For example, this year there will be on show a new type of fermentometer for use in determining thiamine (vitamin B_1) capable of making ten determinations, and two control determinations, simultaneously; also a medical set employing a new micro method for determining sulphonamides in the blood. Other exhibits include a new instrument for continuous *p*H measurement, which is completely self-contained and has electrical circuits requiring no adjustment by the operator. In the same line there is a midget testing set which has just been put on the market for the control of *p*H and chlorine in swimming pools and water purification plants. This is very small, compact and easy to use, giving clear determinations by means of a standard colour comparison.

Another interesting item is a recording viscosimeter, developed in co-operation with a large paint manufacturer, and said to be the first inexpensive instrument of its type.

The Mass Spectrometer

One of the largest factors in the electrical display is a mass spectrometer. So far this is only a laboratory instrument, but there are distinct possibilities that it can be further developed for continuous process control. Among the dozen or so products belonging to the casein family is the entirely new casein (wool) fibre, whose future uses are expected to be manifold. Among the metal and alloy exhibits are several made up of substitute materials. This section is interesting, displaying as it does means of conserving priority material and showing substitutes for commercial use. Metallic aluminium is strictly controlled at present, but not by-products, such as the activated salts used as a drying agent, alumina catalyst, which increases the yield of petrol from petroleum, or alumina hydrate, which when used in compounding rubber, replaces much zinc. Other exhibits reveal the conservation of priority materials through such uses as stainless clad steel replacing solid stainless, and thereby saving nearly 80 per cent. in chromium and nickel.

New means for maintaining high heat-transfer rates on low-temperature differentials, and for providing the closest possible uniformity of temperature control, are provided by a special vaporiser which generates vapour at 175° to 350° C., but at extremely low pressures—roughly 2 lb. abs., to 70 lb. abs., in the temperature range mentioned. This is made possible by the use of a special working fluid having radically different properties in the vapour phase from the steam it replaces, which, for a like temperature range, would require exceedingly high pressures. The vaporiser is similar to a steam boiler in principle, but specially designed and constructed for the purpose.

Exceptional results are claimed for a number of processes used in producing chemical manufacturing equipment, as in the case of the platinum laboratory ware and numerous other products in which platinum is used. There are to be numerous exhibits of screening, sorting, and sizing equipment in which various operating principles are used. A line of ceramic filtering, screening, and diffusing materials, developed during the past year, is seen in the form of plates, discs, candles, and cylinders and is designed to replace fragile and "hard-to-clean" materials. Ignition-cleaning laboratory filters, formerly obtainable only from Europe, are now available from an American source.

A manufacturer specialising in equipment for continuous mechanical handling of finely divided solids suspended in liquids, has added to the line of thickeners, agitators, classifiers, etc., a "clariflocculator," so called because it combines in a single tank the two steps of flocculation and sedimentation. For handling heat-sensitive organic and other materials which are easily scorched or burned in dryers of the conventional types, there is a new return current fire dryer, said to be unique in design and construction. From the same source also comes a steam tube dryer for handling inorganic materials, not usually considered heat-sensitive or requiring to be handled in low-temperature equipment. Many materials are effectively flowed and packed by vibratory handling equipment such as feeders, conveyors, constant and batch weighers, and drum and barrel packers. One manufacturer, employing high-frequency vibration apparatus, claims an accuracy of .05 per cent. in eight applications recently made for proportioning iron ores at capacities up to 600 tons per hour.

New Types of Pump

In the long line of pumps exhibited, which includes nearly every known mechanism for propelling liquids and gases, is an unusual "squeegee" type pump which has no contact between the fluid in circulation and any metal. It is actuated by alternately compressing and expanding a tube of rubber or synthetic material. One vacuum pump is especially designed to maintain a very high vacuum when solvents and volatile oils are present in the system which is being evacuated. Another manufacturer of vacuum apparatus is exhibiting equipment capable of handling products ranging from rarefied gases below one micron absolute pressure to semi-fluid materials, such as asphalt and cup grease. For the more viscous materials, which become semi-fluid when heated, there is a steam-jacketed vacuum pump. The same exhibitor's two-stage vacuum pump is said to make possible much faster time in drying out anodes for mercury arc rectifiers, finishing radio tubes and fluorescent lamps, drying and filling thermostatic control bellows, sputtering aluminium, and speeding up many other important operations.

A corrosion-resistant lining material and rubber coatings for the rotors and housings of standard fans is put forward to take the place of the Monel and stainless steel parts, now difficult to obtain. The same producer is exhibiting such products as valves, filters, pumps, piping, kettles, exhausters, and so on. Another item shown for the first time is sulphur and resin-base acid-proof cement.

A great deal of new mechanical equipment will naturally be shown in the way of power and control appliances, regulating devices, weighing and proportioning equipment. There is a series of automatic scales, rapidly giving printed weight records, adapted to all requirements for receiving, batching, proportioning, processing, etc. Another recent development is the use of fibre shipping drums for packing semi-liquids.

What is claimed to be the smallest and lightest practical instrument for detecting combustible gas hazards at the actual scene will be included in an exhibit of industrial safety equipment. Another new item, particularly useful in fire fighting, is a two-way telephone gas mask, providing communication between the wearer and the air supply base, without employing external power.

Aluminium for the enlarged programme of aeroplane production in the United States is not lacking. According to a representative of the Aluminium Company, during the past six months they have made more aluminium than they had been able to sell, and have increased their reserve supply to 30,000,000 pounds.

FILTRATION OF GRANULAR MATERIALS

Characteristics of Different Types of Plant

WHERE the filtration of granular solids is concerned, the rate of filtering is so rapid as to be substantially constant for all practical thicknesses of cake. Owing to the porosity of the material, the pressure drop across cake and filter is insufficient to hold the cake firmly, unless assisted by the velocity head created by drawing large volumes of air through it. Another factor in this type of filtration is the rapid settlement of the suspended solids which makes it difficult to handle the magma and maintain a uniform suspension.

In dealing with the dewatering and drying of granular materials by rotary vacuum and top-feed filters A. J. Barnebl (*Chem. and Met. Eng.*, 1941, *48*, 7, p. 80) refers to the fundamental importance of the Oliver salt-type unit in establishing sound engineering principles of construction, including the reduction of resistance to air flow, the use of wire cloth as filter medium, and hydraulic as well as mechanical agitation to keep solids in suspension and ensure reasonably uniform formation of cake. Improvements introduced by the Dorrco filter include elimination of the need for agitation, this machine being, in effect, a rotary vacuum filter turned inside out, with the filter medium placed inside a drum which acts as feed tank. The coarser particles, settling out first, form a porous cake which acts as filter bed for the finer particles. In yet another design, the drum is enclosed in a hot-air hood except on top where feed is applied. Originally, the top-feed filter was introduced for salt filtration with no thought of producing completely dry material, but full drying has since become the main feature of this design.

Choice of Filter

On the promise that all filter drums used for granular materials are now being designed to handle large volumes of air, and that control of feed density and drum submergence is preferable to brine stream agitation, the author asserts that the logical choice is: (1) top-feed filters where maximum drying is required or where solids are so coarse that they cannot be kept in suspension; (2) rotary vacuum filters for dewatering, or dewatering and washing. Apart from possible difficulty in keeping solids in uniform suspension in the tank, a rotary vacuum filter offers the advantages of ample surface for washing the cake, control of capacity by drum submergence and feed density, and power of regulating the thickness of cake left on the filter to avoid contamination. A shower pipe under the scraper washes and cleans the filter-medium continuously and avoids excessive blinding. Finally, the drum can be hooded and fitted with steam showers or heaters if required, or the hood can be made vapour-tight for dealing with volatile liquids.

Merits of the top-feed filter include ability to handle denser feed, facilitating complete drying and permitting the use of a more open filter-medium, an essential factor in the elimination of cover blinding by insoluble solids. Possible difficulties in discharging damp cake and in washing the cake can be minimised by suitable design.

Cake Formation

Smoothness of cake formation is a function of magma density, *i.e.*, ratio of suspended solids to liquid, the optimum value of which is apt to be rather critical. The correct density, which varies with the material filtered and must be determined in each case, is generally with between 15 and 20 per cent. by weight of suspended solids in the magma. Agitator speed and the clearance between rakes and drum have definite effects on good cake formation. The Swenson feed hopper can be readily applied to any type of filter as a means of maintaining uniform control of feed density and volume. Solids settle quickly to the bottom outlet of the tapering hopper, substantially clear liquid overflowing, and the magma going to the filter can be readily controlled by adding water or filtrate at the discharge nozzle.

The severe conditions encountered in the filtration and drying of granular materials limit the choice of filter-medium to wire cloth and perforated plate. Wire cloth is easily applied, forming a smooth surface which expands and contracts without excessive warpage. Perforated plate is stiffer, with a smooth surface simplifying the stripping of cake unless high temperatures are encountered, when warping may interfere with scraper operation. Rolled wire screens are liable to have an uneven surface owing to distortion by rolling.

The trend towards the use of large openings in the filter-medium allows of the use of heavier wire, giving longer life and better performance. With an open medium, the grid design can be modified to eliminate the drainage screen, thus simplifying cleaning and minimising the tendency to cover-blinding, which may be a serious problem in the filtration of granular material, particularly where insoluble materials are concerned. With soluble solids, the size of the openings is of minor importance, provided that they are large enough to avoid plugging by insoluble impurities, and that the total open area is sufficient to pass the required volume of air without undue resistance. Proper control of magma density enables openings larger than the particles in the feed to retain them by a bridging action. Appropriate washing, by soft water or by weak acid or alkali, helps to prevent certain types of blinding. In other cases, keeping the filter cake hot or possibly the use of a steam blow may be the remedy, while blinding by soaps depends upon the use of an open mesh, a strong water shower, and a well distributed reverse blow.

Factors influencing the residual moisture of the cake include particle-size, exhauster-displacement, and degree of vacuum. The higher the air velocity through the cake, the more moisture is removed, and the relation between air velocity and vacuum makes the latter a guide to the best operating conditions. Filter throughput depending on drum speed and cake thickness, is also a determining factor, and other factors being equal, the cake moisture decreases rapidly as the filter time increases.

Drying Cake

The solubility of the salt and the water bound as water of crystallisation are determining factors which must be taken into consideration, together with the working temperatures, if complete drying of cake is to be effected. The more soluble the salt, the lower the free moisture in the cake, the liquor being a saturated solution from which the salt crystallises on drying. When hydrated salts are produced, the liquor in the cake comprises a part of the salt, water of hydration, and free water. In this case, a very low free moisture content of the filter cake is generally obtainable.

The top-feed filter dries without disturbing the crystals and permits intimate contact between crystals and the hot air. Also, some of the liquor is removed mechanically by the high velocity of the air, increasing the over-all efficiency of the system. On the other hand, some of the material remains on the drum to be rewetted and dried a second time, and it is difficult to avoid this because the final scraper must be rigid and allowance must be made for expansion of the filter drum. For efficient drying on a top-feed filter, it is desirable for the magma to be of maximum solids content consistent with even distribution of the feed, and it is important for the filter cake to be of uniform porosity and thickness so that the break-through of air, following extraction of the excess liquor, occurs uniformly over the whole area. Once air has broken through, evaporation begins and the drying action is further accelerated by heating, crystallisation, and lowering of viscosity, in varying degrees according to the properties of the material concerned. A considerable fraction of the total heat supply goes to heat solids from the feed to the discharge temperature. Part of the heat is accounted for by radiation, part by leakage, and the balance by ineffi-

ciencies in the heater itself. In a typical case, the over-all thermal efficiency of the drying of scrubbed foundry sand was 47.7 per cent.

Increasing the temperature of the air supplied to the hood of a top-feed filter enables drying to be effected by less air, but the exhauster must be designed to handle the greater amount of vapour unless means can be devised for complete condensation. This is not easy, because the high velocities result in more or less serious entrainment of the condensing water. On the other hand, the use of low-temperature air decreases the over-all thermal efficiency and raises the exhauster power requirements. Typical data for top-feed filters are given as follows: from 175 to 200 cu. ft. of air per min. per sq. ft. of filter area when using low temperature air; cake thickness from ½ to 1½ in. for normal operation; drum speed from ¼ to 2 r.p.m., according to tonnage, air temperature and permissible cake thickness; cake moisture from 1 to 12 per cent. initially, excluding water of crystallisation, according to particle size and the characteristics of the material; final cake moisture between 0.05 and 2 per cent., the value at discharge being usually about 0.5 per cent. higher than the final value desired, so that heat in the cake may be utilised in completing the drying. The air temperature is generally between 120° and 550° C., according to the material concerned, but should preferably be lower than 480° C. to avoid the need for special constructional materials. Operating conditions are in any case severe, owing to the combination of high temperature and abrasive action. Each installation should be designed with full consideration of its individual engineering requirements, taking into account the chemical and physical characteristics of the material to be filtered. Co-operation between user and designer is essential, and it is highly desirable for as much information as possible to be made available concerning the performance of installations already in operation.

Personal Notes

MR. WILLIAM ANTHONY ALLEN, of Stafford Allen and Sons, Ltd., was married recently at Hawick, Roxburghshire, to Miss Marion Wall.

MR. G. W. BRADLEY, F.I.C., coke-oven manager at Grassmoor Coke Ovens, near Chesterfield, has been elected to a seat on the board of the Grassmoor Co., Ltd.

MR. E. W. SHARMAN has been elected a director of the British Gas Purifying Materials Co., Ltd., Leicester. Before joining the firm in 1933, he was on the technical staff of the North Middlesex Gas Co.

THE HON. DEREK MOND, son of Lord Melchett (deputy chairman of Imperial Chemical Industries, Ltd.), has been elected secretary of the Oxford Union Society for next term.

DR WILLIAM CULLEN, president of the Society of Chemical Industry, last week visited Cardiff and addressed members of the South Wales section on the organisation and allocation of industrial chemists in the South Wales area.

MR. J. CROMBIE, of James Anderson and Co. (Colours), Ltd., succeeds MR. J. B. DUNN as chairman of the British Colour Makers' Association, and MR. H. G. FERGUSON, of the Cornbrook Chemical Co., Ltd., becomes vice-chairman. These elections were made at the annual general meeting on November 18.

Obituary

MAJOR JOHN LEE, who died recently at Beverley, was at the outbreak of war district engineer at Leeds with the Shell Mex and B.P. Company. He had held a similar position with the company in Hull.

MR. ROWLAND NEW, who died recently at Parkgate, Cheshire, was a director of Vinolia Co., Ltd., soap manufacturers, and for 24 years, until his retirement in 1924, he was manager of the foreign and colonial department of Lever Bros. and Co., Ltd.

MR. WILLIAM THOMAS CALDERWOOD, O.B.E., M.C., B.Sc., managing director of Thomas Hedley & Co., Ltd., soapmakers, of Newcastle-on-Tyne, died at Newcastle on November 24, aged 48.

F/O. KENNETH CAMPBELL, R.A.F.V.R., who was previously reported missing, now reported killed in air operations in April, was on the staff of I.C.I. until the outbreak of war, having previously graduated at Cambridge.

MR. WILLIAM HAY, who died recently at Sheffield, aged 81, was for a number of years in control of the collieries owned by Newton, Chambers and Co., Ltd. He was a technical director of that company, chairman of its associated company, Thorncliffe Coal Distillation, Ltd., and a director of several other companies in the Barnsley area.

DR. WILLIAM LEWIS DAVIES, Ph.D., D.Sc., F.I.C., the report of whose death in India has just reached us, was especially noted as a dairy chemist, and his book, *The Chemistry of Milk*, is regarded as a standard treatise. He accepted the position of Director of Dairy Research to the Government of India only in 1939, but the climate of his adopted country disagreed with him, and he died on May 15 at the early age of 45. His death will be especially regretted in this country by those who worked under him at the Chelsea Polytechnic and at the National Institute for Research in Dairying, Shinfield.

MR. JAMES MORTIMER BUSH, who died on November 20 at Northwood, Middlesex, aged 78, was the third son of William John Bush, founder of the firm that bears his name, now famous as manufacturers of fine chemicals and distillers of essential oils. J. M. Bush began work in the factory 62 years ago; shortly before the death of his father he was admitted into partnership; and when in 1897 the business was converted into a limited company, he assumed the position of joint managing director with his brother, A. W. Bush, under the chairmanship of his elder brother, William, Baron de Bush. On the Baron's death in June, 1903, "J.M.B." succeeded him as chairman, still retaining his managing directorship. This position he held until his death, and during the last decade was affectionately known to all his employees as "The Chairman." He was one of the founders of the British Essence Manufacturers' Association, and since its inception in 1917 was the Association's chairman; in May last year he was elected chairman of the Essence Export Group. He was a native of London and was a Freeman of that City. During the present war he refused to vacate his London flat, and it was not until he had been bombed twice that he moved and lived either at Brighton or Northwood. Up to the last he was an active man attending the office four or five days a week. He died preparing to go to Hackney, where so much of his energy, life and interest had been centred. It was as he would have wished, in harness. He leaves one son, Eric Lionel Bush, a director of the company, who now holds a commission in the Royal Artillery.

Staple Fibre Experiments

Treatment of Waste Products in Germany

WASTE products from the treatment of flax and rape, hemp residues, straw and reed will be used as raw materials in German staple fibre factories if experiments now carried out by Süddeutsche Zellwolle A.G. at Kelheim (Bavaria) prove successful. The company announced in its latest annual report the construction of a pilot plant with a capacity of one ton daily for the so-called "directive process," a new method of producing staple fibre which is claimed to result in a shortening of the manufacturing process. The raw material is milled beforehand to a very small size, which permits the use of fibrous substances previously considered of no value, but whether the new process can compete economically with the old ones still remains to be seen. Other experiments by the company aim at the production of a "voluminous" textile fibre which resembles natural wool more closely.

World Petroleum Products

Increasing Output of Heavy Oils

ACCORDING to a table showing the yearly output of the various petroleum products from 1931 to 1940 in all countries for which data are at hand, production in the United States increased considerably in 1939 and 1940. For motor spirit, the figures rose from 60.3 million metric tons in 1938 to 65.1 in 1939 and 65.2 in 1940 (1931: 46 million). For heavy oils, the increase was still greater, viz., from 64.4 million metric tons in 1938 to 67.4 in 1939 and 71.8 in 1940. The output of natural gasoline, kerosene and lubricating oils has also been increasing.

In Venezuela, the production of heavy oils is developing rapidly; it doubled between 1939 (1557 thousand metric tons) and 1940 (3152 thousand). Figures for Curaçao, where crude petroleum from Venezuela is refined, are not available for 1940. In the Netherlands East Indies, production was practically at the same level in 1940 as in 1939, i.e., about twice as high as ten years ago.

In Rumania, production dropped slightly; for motor spirit it fell from 1567 thousand metric tons in 1939 to 1443 thousand in 1940; for heavy oils, from 2987 thousand metric tons in 1938 to 2724 in 1939 and 2602 in 1940. No recent data are available for the U.S.S.R., but the output of crude petroleum is known to have been maintained in 1939 and 1940 at about 30 million metric tons, about one-sixth of the United States output. In countries which are secondary producers, such as British Borneo, Argentine, Brazil, Uruguay, production has also been developing.

New Control Orders

Chemical Products Exempt from Duties

THE Import Duties (Exemptions) (No. 4) Order (S.R. and O. No. 1771, 1941) provides that the goods specified in the First Schedule to this Order shall be added to the First Schedule to the Import Duties Act, 1932 (in this Order referred to as "the Exemptions Schedule.") Items of chemical interest appearing in the schedule are:—

Coconut charcoal (other than activated); carbon black from natural gas or acetylene; yellow phosphorus; ferro-titanium and ferro-carbon-titanium; ferro-vanadium; ferro-molybdenum; ferro-tungsten; calcium silicide; aluminium powder and paste; magnesium powder; vanadium and its compounds; chromium metal; manganese metal; molybdenum and its compounds; tungsten metal; iridium, petroleum jelly; and mixtures the sole ingredients whereof are chlorsulphonic acid and sulphur trioxide.

Also the following chemicals: acetone; ammonium nitrate and perchlorate; aniline (aniline oil); benzanilide; benzoyl chloride; carbon tetrachloride; chromic acid (chromium anhydride); diethyl diphenylurea; dimethyl diphenylurea; dimethylaniline; diphenylamine; glycerine; glycol (ethylene glycol); guanidine nitrate; hexachlorethane; hydroquinone; lithium carbonate and hydroxide; nitroguanidine; picric acid; potassium nitrate and perchlorate; stannic chloride; titanium tetrachloride; trinitrophenol methylnitramine; trinitrotoluene; and triacetin (glyceryl triacetate).

The Import Duties (Exemptions) (No. 5) Order (S.R. and O. No. 1772, 1941) provides that spiegeleisen and ferro-manganese shall be added to the first schedule to the Import Duties Act, 1932.

Furthermore, the Safeguarding of Industries (No. 5) Order (S.R. and O. No. 1773, 1941) provides that such of the articles mentioned in the schedule to the Order as were not entered under the Customs Acts before November 19, 1941, or as have not been removed from a bonded warehouse before that date, shall be exempt from the duty imposed by Section I of the Safeguarding of Industries Act, 1921, as amended by the Finance Acts, 1926 and 1936, for a period ending on December 31, 1941.

The Schedule includes the following articles: acetone; acetone, synthetic; acid chromic (chromium anhydride); acid picric; benzanilide; carbon tetrachloride; diethyl diphenylurea; dimethylaniline; dimethyldiphenylurea; diphenylamine; ethylene glycol (glycol); glyceryl triacetate (triacetin); guanidine nitrate; hexachlorethane (carbon trichloride); hydroquinone; lithium hydroxide; nitroguanidine; trinitrotoluene; titanium tetrachloride; metallic tungsten and ferro-tungsten; lithium carbonate; molybdenum, ferro-molybdenum and molybdenum compounds, and vanadium, ferro-vanadium and vanadium compounds (but not including ores or minerals of molybdenum or vanadium); ferro-titanium containing not more than 2 per cent. of carbon; manganese metal containing not more than 1 per cent. of carbon; and chromium metal.

Vitamin Oils in South Africa

Possible Industrial Use

LEADING wholesale chemists in South Africa agree that cod liver oil is of more importance to their business than other vitamin-containing oils. Even before the war, however, there was some replacement of cod liver oil by peanut, and possibly similar oils, vitaminised locally by the addition of synthetic vitamins A and D, also produced locally. Experiments are being carried out on the production and use of vitaminised peanut butter, carrying 2500 U.S.P. units per gram. The domestic oils are largely stockfish and shark liver oils.

Specifications in all cases are those of the British Pharmacopœia or B.P. Codex. The stockfish liver oil is said to possess vitamin A potency averaging 10,000 international units and a vitamin D potency averaging 200 units per gram. The shark liver oil, on the other hand, has shown a vitamin A potency ranging from 10,000 to 200,000 international units per gram; the mean of this range is said to be about 70,000. The vitamin D potency of the shark liver oil is still subject to tests, but is believed to be negligible.

Prices of the oils fluctuate greatly; in some cases prices of imported oils are merely nominal, since supplies are not coming forward. Moreover imported fish liver oils are subject to a duty of 20 per cent. *ad valorem* and industrial fish oils are dutiable at 15 per cent. *ad valorem*.

A number of industries use, or might use, these oils, such as paint manufacturing and tanning, though no definite information can be obtained that there is any great demand from these sources. There is therefore no urgent call for domestic production of industrial fish oils or an immediate outlet for imported oils. Present consumption is confined largely to medicinal and vitamin-containing oils reduced from fish livers and viscera; a growing proportion is, however, finding its way into animal feedstuffs.

Eire Fertiliser Position

Severe Shortage Threatened

DR. JAMES RYAN, Eire Minister for Agriculture, has reviewed the present fertiliser situation in Eire. Phosphates, potash, and sulphate of ammonia, he says, are no longer procurable. The full requirements of these fertilisers were not available last season, but largely owing to reserve stocks accumulated by fertiliser manufacturers the position was comparatively satisfactory. At the end of the season these reserves had disappeared, and only a small quantity of phosphates had been imported. Phosphate deposits in County Clare are being developed as rapidly as possible, but even so the quantity will fall far short of the requirements. There is also a shortage of pyrites, necessary for the production of sulphuric acid used in the manufacture of superphosphate. Only limited stocks of sulphate of ammonia and potash reserved from last season are in sight or likely to be available. These quantities are so small that it has been decided to utilise them, as well as the phosphates on hand, for the manufacture of one grade of compound manure. The total quantity available will probably not exceed one-third of the combined quantity of superphosphate and compound manure distributed during the past season. Neither nitrogenous nor potash manures will be available for distribution.

General News

The Pharmaceutical Society of Great Britain is organising an extension of its War Aid Fund to mark the close of its centenary year. In addition to contributions, profits of the Centenary Book, which the Society is publishing at 8s. 6d., will be devoted to the purposes of the Fund.

The following have been elected members of the Society of Public Analysts: G. J. W. Ferrey, B.Sc., F.I.C., W. Garner, M.Sc., A.I.C., J. Haynes, G. MacDougall, Ph.D., W. Murray, A.M.C.T., A.I.C., Margaret Pearson, F.I.C., H. E. Sansom, B.Sc., R. H. Settle, B.A., F.I.C., and C. L. Silverstone.

With the approval of the Treasury, the Board of Trade has decided that, in respect of the period beginning December 3 and ending March 2, 1942, the rate of premium payable under any policy of insurance issued under the Commodity Insurance Scheme shall continue to be at the rate of 7s. 6d. per cent. per month.

An interesting combined meeting of the Newcastle Section of Society of Chemical Industry and the Coke Oven Managers' Association was held at the Three Tuns Hotel, Durham, on Thursday afternoon, when Dr. R. Quarendon, of I.C.I., read a paper on "The Bacterial Removal of Hydrogen Sulphide from Water Gas and Coal Gas by Peat and Peat-Oxide Mixtures." (*see* THE CHEMICAL AGE, 1941, *45*, 1154, p. 80).

The determination of molybdenum in alloy steels, using formic acid solutions for the precipitation of lead molybdate, instead of the more usual acetic acid method, is described by Gregory, Foulston, and Gray (*Analyst*, 1941, *66*, 788, p. 444). This method avoids the co-precipitation of basic lead vanadates or chromates and, with a weak solution added dropwise, yields a precipitate corresponding more closely with the formula $PbMoO_4$.

The Widnes Foundry and Engineering Co., Ltd., celebrated its centenary this year, the company having been founded by Thomas Robinson in 1841. During the past 100 years it has been engaged in manufacturing heavy castings for the chemical industry and steel constructional work. War condition necessitated curtailment of celebrations, but the company organised a meeting for their employees in the machine shop. Mr. F. R. Stagg, chairman, announced that the directors had decided to make a gift to every employee with one year's service at June 30 last of a week's salary or wages, to those with under one year's service a proportionate gift, and to employees of the company with over 20 years' service (of whom there were 68) additional recognition in the form of National Savings Certificates, which he handed to them personally.

Foreign News

The Western Powder Company's entire plant at Edwards, Illinois, is reported to have blown up. The blast was heard fifteen miles away and a number of casualties are reported.

American paint manufacturers are reported to be proposing to illuminate bomber cabins with luminous calcium or similar sulphides.

Production of zinc in the United States during August totalled 62,823 tons of recoverable zinc compared with 59,800 tons in July and 62,916 tons in June.

The Alberta Nitrogen Company's ammonia plant at Calgary is expected to be in production shortly, and it is now proposed not only to erect an extension to this ammonia plant, but also to build a nitrate plant near by, starting immediately.

During April, Burmese imports of chemicals and preparations were Rs.3,84,000, compared with Rs.4,84,000 in April, 1940. Imports of drugs and medicines increased from Rs.1,63,000 to Rs.1,91,000.

United States production of manganese ore, containing 35 per cent. or more manganese (natural), during August was 9100 long tons, shipments were 9000 tons, and producers' stocks at the end of the month 1200 tons.

Capacity of the Swedish sulphite alcohol factories will soon reach 70-75 million litres, or twice the pre-war output, when some plants now under construction have been completed. No less than 32 companies are now engaged in this industry.

From Week to Week

The state-subsidised Italian mining company, Azienda Minerali Metallici Italiani, is to raise its capital from 140 to 200 million lire and to extend its prospecting activities to Croatia, Montenegro and Greece.

A bauxite mine is reported to have been opened in the Gold Coast about 50 miles north-west of Dunkwa. The ore can be hauled by truck to Dunkwa and then by rail to the port of Takoradi.

Sulphate of ammonia production in the U.S.A. remained at the high figure of over 62,000 tons, making 493,360 tons for January-August, 1941, compared with 464,350 in the first eight months of 1940. By-product ammonia liquor continued at about 2700 tons (NH_3 content) per month.

Production of cement in Peru is rapidly increasing, and reached 124,480 metric tons in 1940, compared with a yearly average of 58,600 tons over the previous ten years, according to a report recently issued by the Peruvian Ministry of Foreign Affairs.

Decrees have been issued authorising the Banco de la Nación Argentina to grant credits for the development of the coal-mining industry and for the expansion of mining activities in connection with the production of non-ferrous metals, including tungsten and beryllium.

Several samplings from the graphite claims at Saglek Bay, Labrador, are said to have shown an average content of 80 per cent. pure graphite. A mill test on a shipment to New York indicated the same high percentage. Efforts towards commercial production are said to be progressing.

I. G. Farbenindustrie is to erect a plant for the manufacture of nitrogenous fertilisers in Spain. The new works will be operated by Nitratos de Castilla S.A., a company formed for this purpose by Saltos de Duero S.A. Production is to begin in 1944, and the plant capacity is estimated at 10,000 tons per annum.

The diatomaceous earth deposit covering 1000 acres at Terrebonne, Central Oregon, U.S.A., has been worked by the Dicalite Co. for some years, and, since 1940, by means of a completely rebuilt plant. A notable feature of the site is that the diatoms are of fresh-water origin, and the deposit is believed to be the only commercially important instance of this nature.

Efforts are being made in Denmark to find substitutes for imported oilseeds. Every possible oil-yielding seed and berry is being collected for experimental purposes; these included beech mast, mustard seed, and rape seed. Linseed production has been increased, and about 2000 tons of seed were gathered during the past year.

Forthcoming Events

The London Section of the **Society of Chemical Industry** will meet on **December 1,** in the Rooms of the Chemical Society, Burlington House, W.1., at 2.15 p.m., when Dr. T. H. Durrans, D.Sc., F.I.C., will speak on "The Fine Chemical Industry as a Servant of the Community."

A joint meeting of the **Society of Chemical Industry** with the **Society of Public Analysts** will take place on **December 3,** at 11.30 a.m., in the rooms of the Chemical Society, Burlington House, W.1, when four papers dealing with "The Fortification and Enrichment of Human Foods by the Addition of Specific Nutrients" will be delivered.

A meeting of the **Birmingham Paint, Varnish, and Lacquer Club** will take place on **December 6** in the afternoon at the Grand Hotel, Birmingham, when Mr. A. E. Bevan, B.Sc., will speak on "The Chemistry of Alkyd Resins."

The annual meeting of the **Electrodepositors' Technical Society** will take place at the Northampton Polytechnic, St. John Street, London, E.C.1, on **December 8** at 4 p.m., when Mr. G. G. J. Adey will present a paper entitled "Mass Production of Electro-Galvanised Strip and Sheets," after the business of the Society has been transacted.

A joint meeting of the **Institution of Chemical Engineers** and the **Chemical Engineering Group** will be held on **December 9** at 2.30 p.m. in the rooms of the Geological Society, Burlington House, Piccadilly, W.1, when a paper entitled "A New System of Double Filtration for Sewage and Certain Trade Waste Waters" will be presented by Dr. A. Parker, F.I.C., Assistant Director of Water Pollution Research.

A meeting of the Colour Group of the **Physical Society** will take place at 2.35 p.m. on **December 10** in the Lecture Theatre of the Electric Lamp Manufacturers' Association, 2 Savoy Hill, London, W.C.2, when a paper on "Colour Blindness and its Importance in Industry" will be read by Dr. F. G. H. Pitt, Ph.D., A.R.C.S.

The **Oil and Colour Chemists' Association** is to hold a joint meeting with the Birmingham and Midland Section of the **Society of Chemical Industry** at the Chamber of Commerce, Birmingham, on **December 11,** at 4 p.m., when Drs. J. R. Alexander, G. L. Wild, and F. J. Siddle will present three short papers on synthetic resins.

A general meeting of the **North of England Institute of Mining and Mechanical Engineers** will be held at 2 p.m. on **December 13** in the Lecture Theatre of the Institute, Newcastle-upon-Tyne.

The Dominions and Colonies Section of the **Royal Society of Arts** will meet on **December 16,** at 1.45 p.m., at John Adam Street, Adelphi, London, W.C.2, when a paper on "British Empire Drug Production" will be read by Dr. Maurice Ashby, D.I.C., A.R.C.S. Mr. Arthur Mortimer will be in the chair.

British Chemical Prices

Market Reports

ACTIVITY on the market for general chemicals remains steady with the volume of new bookings restricted in several directions by the scarcity of available supplies. On the other hand, however, delivery specifications from priority consuming industries are being made satisfactorily and the movement here in the aggregate is substantial. Values generally are unchanged at recent levels. The chief feature in the market for coal tar products is the effect on trading conditions of official control and the market is eagerly awaiting some clarification of the position. The movement in carbolic acid crystals continues to be steady, and a fair amount of activity is reported for the solvent and heavy naphthas. Both xylol and toluol are active and firm.

MANCHESTER.—Chemical prices on the Manchester market remain generally firm in tendency, and in most directions supplies are moving steadily into consumption. Most classes of soda compounds are finding ready outlets and a fair trade is passing in the ammonia and magnesia products. The many users of borax and boric acid, which have moved sharply upward, are pressing for supplies. With regard to the tar products actual changes compared with a week ago have been few. Good quantities of most descriptions are being taken up against contracts, but the volume of fresh buying is restricted owing to control uncertainties.

GLASGOW.—The position in the Scottish heavy chemical trade remains unchanged from last week, home business keeping up its steady day-to-day transactions for prompt delivery. Export inquiries are still rather limited. Prices remain unchanged.

Price Changes

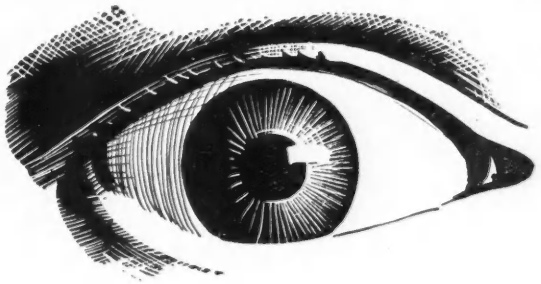
Borax, Commercial.—Granulated, £31 10s.; crystal, £32 10s.; powder, £33; extra fine powder, £34; B.P. crystals, £40 10s.; powdered, £41; extra fine, £42 per ton for ton lots in free 1-cwt. bags, carriage paid in Great Britain. Borax Glass, lump, £83; powdered, £84 per ton in tin-lined cases, for home trade only, packages free, carriage paid, in Great Britain.

Boric Acid.—Commercial, granulated, £52 15s.; crystals, £53 15s.; powdered, £54 15s.; extra fine powder, £56 15s.; B.P. crystals £61 15s.

Citric Acid.—1s. 5½d. per lb. The price of 1s. 10d. per lb., quoted in this column last week, was without foundation, the information having been supplied to us erroneously through a mistake on the part of our informants.

Tartaric Acid.—MANCHESTER: 4s. per lb.

Turpentine.—American, 90s. per cwt. in drums or barrels, as imported.



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Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

PALMYRA MANUFACTURING CO., LTD., London, N., manufacturers and chemical dyers. (M., 29/11/41).—October 29 mortgage, to Midland Bank, Ltd , securing all moneys due or to become due to the Bank; charged on land and factory at Vale Road, Tottenham, and fixtures. *Nil. December 9, 1910.

Company News

The Anglo-Iranian Oil Co., Ltd., announces a trading profit for 1940 of £5,747,440 (£4,835,827), and, as already announced, the ordinary dividend is unchanged at 5 per cent.

The Anchor Chemical Co., Ltd., have declared a dividend of 3 per cent. on the 6 per cent. cumulative preference shares for the half-year ending November 30.

The Kolok Manufacturing Co., Ltd., has announced a final distribution of 80 per cent. on the deferred stock, making 120 per cent. for the year (same).

Stewarts and Lloyds of South Africa have declared a dividend of 3 per cent. on the 6 per cent. first cumulative preference shares, for the half-year to December 31.

New Companies Registered

British Ichthyol, Ltd. (370,824).—Private company. Capital, £1000 in 1000 shares of £1 each. Manufacturing chemists, manufacturers of insecticides and germicides, oil and mineral refiners, etc. Directors: E. Burnet and F. W. Porritt. Registered office: Empire House, Union Court, Old Broad Street, E.C.2.

Beauchamp, Fraser & Company, Ltd. (370,751).—Private company. Capital, £1100 in 1000 preference shares of £1 each and 2000 ordinary shares of 1s. each. Manufacturers, merchants and stockists of heavy and fine chemical products, synthetics, resins, plastics, films, filaments, fibres, bristles, yarns, etc. Directors: R. B. Beauchamp; G. W. B. Beauchamp; J. P. Fraser; H. Maggs. Registered office: High Street, Shepton Mallet, Somerset.

Nick-el-Electro, Ltd. (370,743).—Private company. Capital, £3000 in 3000 shares of £1 each. To acquire the business of a laboratory furnisher carried on by Chas. E. R. Terry as "Nick-el-Electro" at 55 Clement Street, Birmingham; and manufacturers of and dealers in laboratory ware in nickel, stainless steel, monel metal, and other metals and alloys, and in porcelain, glass and plastic materials, etc. Subscribers: Charles E. R. Terry and John M. Terry. Registered office: 55 Clement Street, Birmingham.

Chemical and Allied Stocks and Shares

SENTIMENT in the stock and share markets has been governed by the encouraging views current in regard to the war developments earlier in the week, and there has been a widespread advance in security values. The rise in the latter was attributed partly to the fact that many stocks and shares have remained in small supply owing to the firmness with which they are held. At the time of writing, best prices recorded in the past few days have not been fully maintained, but profit-taking has been very moderate, and industrial securities are now around their best levels since the war. It is realised that there can be no early improvement in dividends, but there is confidence that dividend payments of many leading companies will continue to be at satisfactory rates, and there are increasing hopes that in many directions it will be possible to re-establish earning capacity after the war.

Aided by the surrounding market trend, Imperial Chemical have further improved to 33s. 6d. at the time of writing, which compares with 33s. 1½d. a week ago; the 7 per cent. preference units were also higher at 34s. 4½d. B. Laporte transferred up to 65s., and elsewhere, Fison Packard showed business around 36s. 3d. British Plaster Board 5s. shares, which remained under the influence of the doubling of the interim dividend, have further advanced, and are 20s. 6d. xd. at the time of writing, compared with 19s. a week ago. Moreover, in other directions, Associated Cement were better at 51s. 3d. There was further buying of the units of the Distillers Co. which rose on balance from 71s. 9d. to 74s., sentiment having continued to reflect the current market view that some of the company's subsidiary and allied interests may be showing an upward trend in earnings.

The apparently satisfactory yield on the basis of last year's 22½ per cent. distribution attracted attention to United Molasses 6s. 8d. units, which have moved from 29s. 7½d. to 31s. 6d. at the time of writing. Among other gains, Dunlop Rubber have risen on balance from 38s. 3d. to 39s.; Triplex Glass from 32s. 4½d. to 33s. 4½d., and Boots Drug from 35s. 6d. to 37s. 6d. Tube Investments were little changed at 87s., the disposition being to await the full financial results and the chairman's annual statement. On the other hand, Dorman Long were better at 22s. 3d., awaiting the dividend announcement, and Stewarts and Lloyds had a firmer appearance at 45s. 10½d., while United Steel were 23s. 3d. and Staveley ordinary 45s. 6d. In fact, although most iron and steel companies are unfavourably placed in regard to E.P.T. and it is not always easy to estimate the extent to which the latter will bear on profits, iron and steel securities have been in better demand, buyers being attracted by the favourable yields shown on the basis of last year's dividends.

In other directions, shares of companies connected with plastics were again active, with British Industrial Plastics 2s. ordinary again changing hands around 3s. 4½d., awaiting the financial results. Erinoid 5s. shares further improved from 6s. 9d. to 7s. 3d., while Lacrinoid Products were around their par value of 2s. and Catalin shares further improved to 3s. Thos. De La Rue transferred up to close on 47s. On the other hand, there has been an easier tendency in paint shares under the influence of the reduced dividend declared by Lewis Berger. The shares of the last-named were around 40s. 6d. xd., while Indestructible Paint were 83s. 9d., and Wall Paper Manufacturers deferred units at 28s. lost part of their recent rise. In some instances, however, quotations were not tested by much business, the shares having remained firmly held. Cellon 5s. ordinary were quoted around 16s., and Goodlass Wall showed dealings around their par value of 10s. In other directions, British Drug Houses were firm at 25s., and Greeff-Chemicals Holdings 5s. ordinary changed hands at 5s. 9d. British Glues 4s. ordinary have been dealt in at 6s. 4½d., at the time of writing. Pending the dividend decision, Imperial Smelting improved from 12s. to 12s. 6d. Oil shares were inclined to fluctuate, although Anglo-Iranian and Burmah Oil tended to improve on the war news.

Rapid expansion of the American plastics industry is being caused by the U.S. Army's interest in adapting plastics to national defence. The Quartermaster Corps has recently added a technical unit dealing with plastics to its supply division, while the Ordnance Department is carrying out extensive experiments with plastic false windshields for 37-mm. armour-piercing shells, bodies of bomb fuses, and fins for mortar shells.

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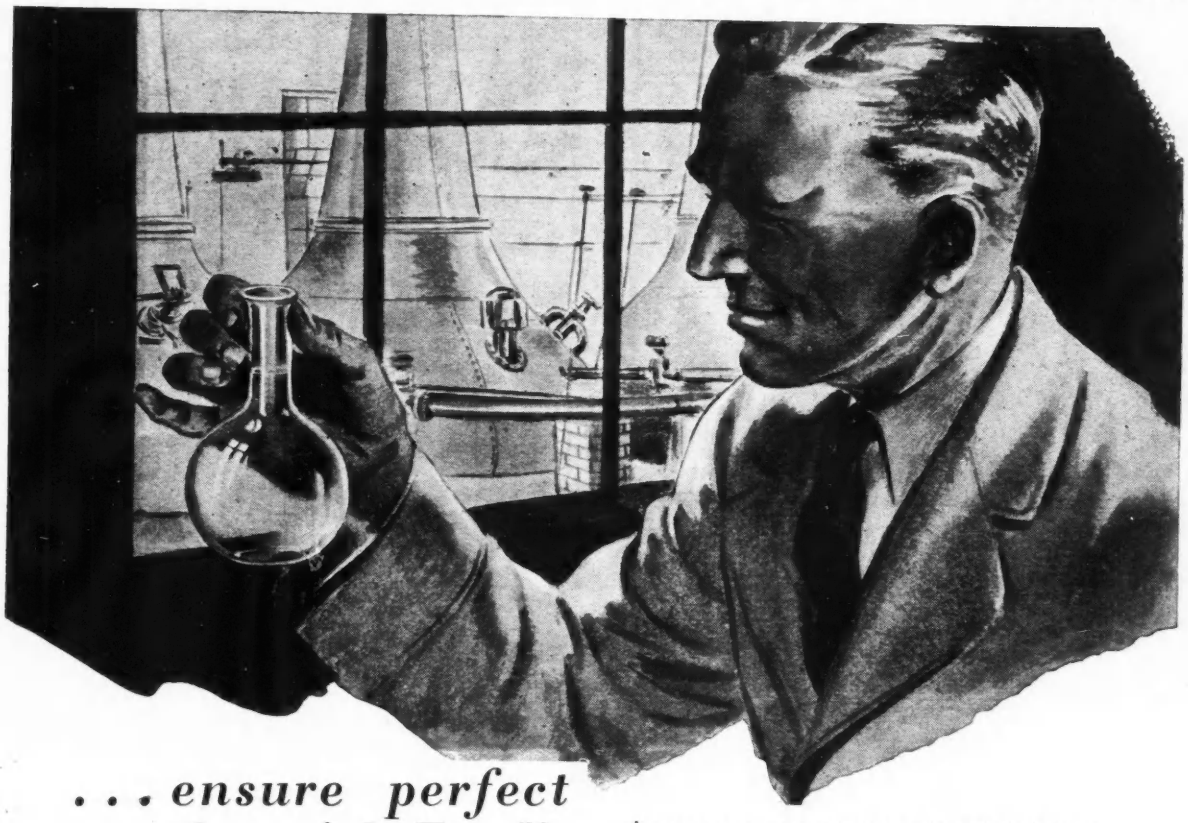

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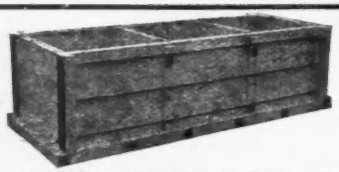

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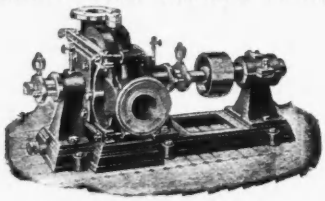
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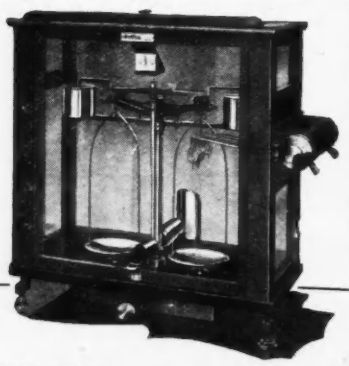
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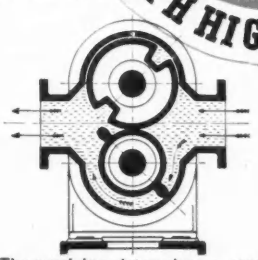

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